Item Response Theory Analysis of the Posttraumatic Stress Disorder Symptoms assessed by Posttraumatic Stress Disorder Checklist for *DSM-5* (PCL-5)

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Recent changes in the *DSM-5* diagnostic criteria for Posttraumatic Stress Disorder (PTSD) symptoms has led to a substantial amount of empirical research supporting alternative models encompassing an increasing number of symptomatic clusters (from 1 to 7; Rasmussen, Verkuilen, Jayawickreme, Wu, & McCluskey, 2019). Simultaneously, studies analyzing whether the *DSM-5* PTSD symptoms converge to a single latent structured in order to make a global PTSD diagnosis are still scare. Thus, this study intended to analyze the unidimensionality of *DSM-5* PTSD symptoms through Item Response Theory.

METHOD

Participants and procedures: a convenience sample of 446 firefighters (currently active professional and volunteers), between18 and 62 years old (M = 35.53; SD = 10.12) and 4 to 22 years of education (M = 11.02; SD = 3.03), was recruited at fire departments across the Portuguese mainland and island territories. Participation was voluntary and compliant with research ethical standards.

Measure: PTSD Checklist for the *DSM-5* (PCL-5; Weathers et al., 2013; Carvalho, da Motta, & Pinto-Gouveia, 2019). The PCL-5 is a 20-item self-report measure that assesses the severity PTSD symptoms in the last month on a 5-point scale. The Portuguese version is internally consistent (α =.94).

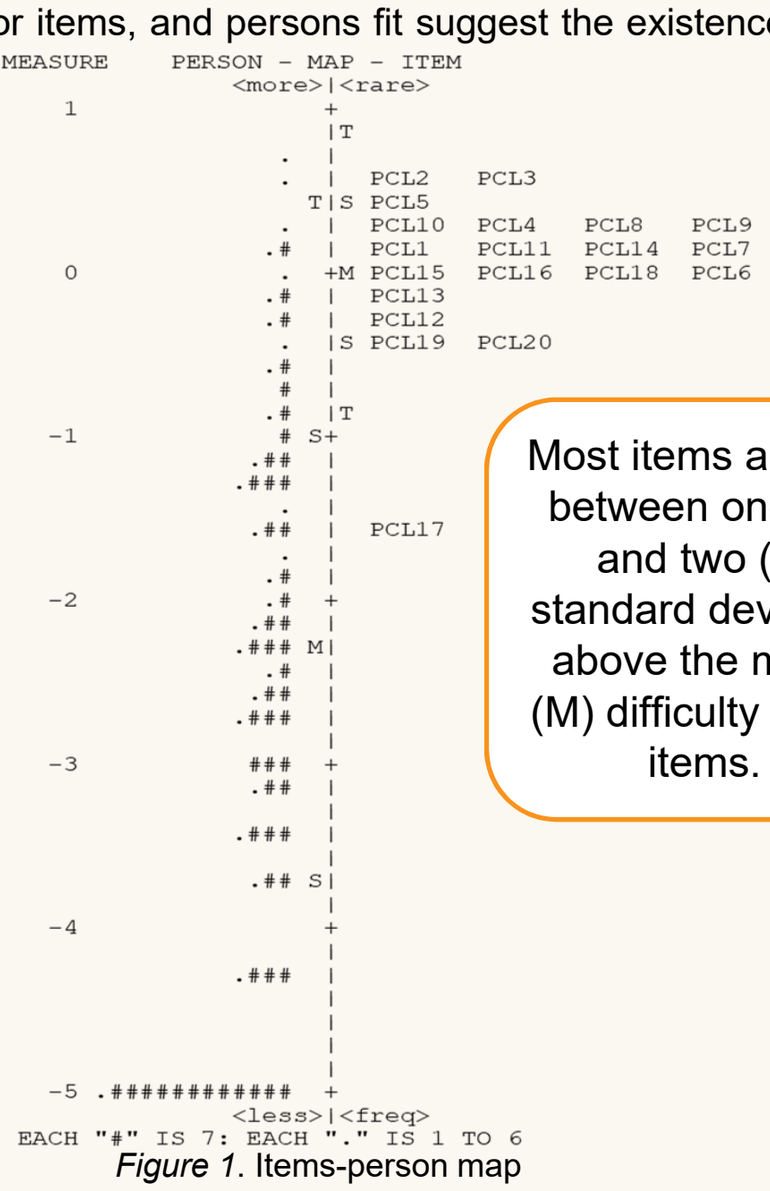
Data analysis: Rasch Model (RM) was used to assess the measure of PTSD symptoms. Goodness of model fit for items and persons were evaluated according to the following criteria: Infit and Outfit > 2.0 degrade the measurement; 1.5 - 2.0 unproductive for measurement; 0.5 - 1.5 productive for measurement; < 0.5 are less productive for measurement, but not degrading. Differential item functioning (DIF) analysis was carried out between participants who scored above and below 33 points (current suggested cutoff point for provisional PTSD diagnosis, according to the original authors).

Table 1. *Global fit statistic PCL-5 of non-extreme scores (n = 387)*

		Measure (θ)	Model Error	Infit	Outfit
Person fit	M	-2.33	.44	1.04	.96
	SD	1.37	.21	.57	.53
	Max	.72	1.02	3.87	3.96
	Min	-4.96	.24	.16	.13
Item fit	M	.00	.08	1.02	.96
	SD	.44	.01	.21	.27
	Max	.52	.09	1.75	1.93
	Min	-1.53	.06	.77	.65

RESULTS

The assumption of one-dimensionality of the PCL-5 was assured by Principal Component Analysis of Residuals. This structure shows an adequate fit for items, and persons fit suggest the existence of outliers (Table 1).



Most items aligned between one (S) and two (T) standard deviation above the mean (M) difficulty of the items.

Figure 1. Items-person map

DIF analysis (fig. 2) showed item's response probability do not vary between participants above or below a 33-points cut-off score, except for items 3, 16 and 17. These differences do not compromise the PCL-5 total test score.

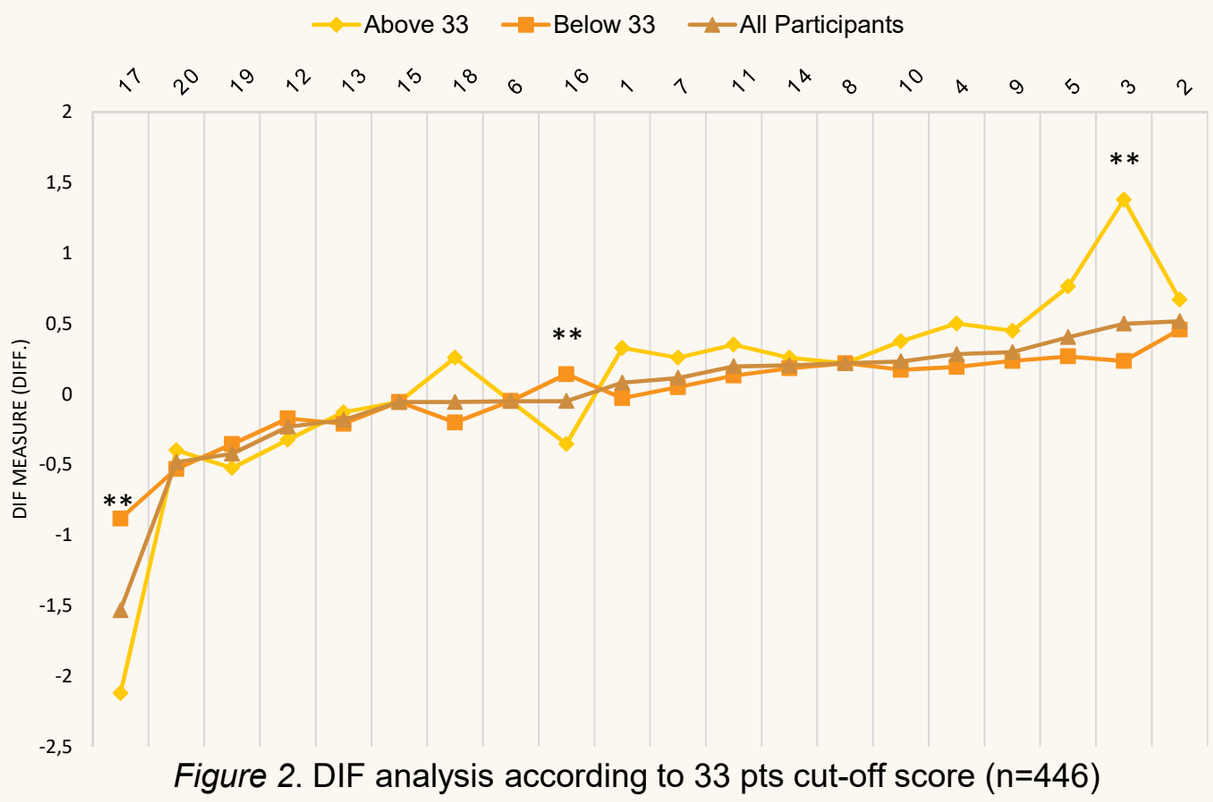


Figure 2. DIF analysis according to 33 pts cut-off score (n=446)

DISCUSSION

Findings lend confidence to clinicians and researchers that DSM-5 symptoms converge to a general PTSD dimension (regardless of their distribution by clusters), and that the use of a PCL-5 total score is effective to assess symptom severity and screen for PTSD. However, future studies with larger clinical samples should be carried out to further address implications of the severity endorsed in specific symptoms.

References

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